REPAIR OF WIDE UNILATERAL CLEFT LIP & ALVEOLUS - HOW IS IT DIFFERENT

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GSR Institute of Facial Plastic Surgery

- Non-profit hospital established in 1996
- Dedicated Cleft & Craniofacial Centre of Excellence
- Presently 1,600 cleft and craniofacial surgeries are done every year
- 3 surgeons and 4 fellows with full support team
- More than 30,000 documented cleft & craniofacial surgeries have been performed since 1996
- 600 primary new born cleft children are registered every year

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Unilateral Cleft Lip Defect
A 3-Dimensional Problem

Oral
- Discontinuity and mal insertion of Orbicularis oris muscle causing horizontal and vertical lip length discrepancy

Nasal
- Deformity of nasal form caused due to mal insertion of Nasalis and other oro-nasal muscles
- Displacement of septum

Alveolar
- Loss of bony support


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Is the morphology of the unilateral cleft lip defect the same in all patients?
Complete Unilateral Cleft Lip

Without Simonart’s band (Type I a)

With Simonart’s band (Type I b)

Without complete collapse of nasal dome and ala (Type II a)

With complete collapse of nasal dome and ala (Type II b)

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Complete Unilateral Cleft Lip

Without difference in level of alveolar ridges (Type III a)

With difference in level of alveolar ridges (Type III b)
Problems of Wide Clefts

• Differential height of the alveolar segments.

• Variations in the horizontal width of the segments.

• Inward turning of the Cupid’s bow towards Columellar base on non cleft side.

• Leading to Severe shortening of skin for Millard rotation.

• Shortening of vertical Height on cleft side and retraction of tissue into the nasal web.

• Collapsed of the nasal dome and severe deviation of nasal septum.
Presurgical Nasoalveolar Orthopedic Moulding in Primary Correction of the Nose, Lip, and Alveolus of Infants Born With Unilateral and Bilateral Clefts

Dr. Barry H. Grayson, DDS
Dr. Court B. Cutting, M.D.

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We don’t believe in NAM. Due to burden of care.

So

We believe in Morpho- Functional Correction.
Goals of Morphofunctional Correction of Unilateral Cleft Lip Defects

A functional anatomical repair of the underlying hard and soft tissues is essential.

Goals of primary cleft lip repair

• Harmonious lip form in vertical and horizontal dimension

• Nasal symmetry

• Bridging the alveolar ridge
Millard’s Incision for Unilateral Cleft Lip (1996-2000)

Produces better results where
• preoperatively there was a more prominent Cupid's bow and
• where the width of the lip and nostril on the cleft (lateral) side were greater than mean values

Source:
Choice of Incision for Primary Repair of Unilateral Complete Cleft Lip: A Comparative Study of Outcomes in 796 Patients.

www.craniofacialinstitute.org

Produces better results
• where the height of the lip on the cleft side was greater and
• where the columella height and width were greater than mean values

Source:
Choice of Incision for Primary Repair of Unilateral Complete Cleft Lip: A Comparative Study of Outcomes in 796 Patients.

www.craniofacialinstitute.org
Choice of Incision for Primary Repair of Unilateral Complete Cleft Lip: A Comparative Study of Outcomes in 796 Patients.

Plastic and Reconstructive Surgery 121:932, 2008

www.craniofacialinstitute.org

- The Millard flap produced better results when there was a need to rotate the cupids bow
- Pfeifer’s design produced better results in the vertical elongation of the lip

It was found that one technique was essentially as good as the other.
An incision utilizing the advantages of both Millard and Pfeifer incision

Afroze incision

- Developed to address the problem of lip length discrepancy and vermillion matching using only one incision.

- Combined the Millard incision on the non-cleft side (medial side) and the Pfeifer incision on the cleft side (lateral side).

- Millard incision on the non-cleft side aids rotation and the Pfeifer incision on the cleft side aids lengthening trying to address horizontal and vertical discrepancies of the lip.

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

www.craniofacialinstitute.org
Afroze Incision

The Afroze incision does not cross onto the base of columella.

Incisions which cross the columella cause scarring leading to growth retardation and severe downward pull of the columella on affected side.

The Afroze incision separates the medial part of ala on cleft side and its associated mal-aligned muscle to further lift the tip of the nose and improve the alar contour and reduce the webbing in the nose.

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

www.craniofacialinstitute.org
Afroze Incision for Functional Cheiloplasty,

www.craniofacialinstitute.org
Morpho-functional Cleft Lip Repair

Incision design for unilateral cleft lip surgery

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

www.craniofacialinstitute.org
Morpho-functional Cleft Lip Repair

Minimal muscle dissection on cleft side ensuring dissection of OrbicularisOris and Alar head of Nasalis muscle

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

www.craniofacialinstitute.org
Wide sub-periosteal dissection is done from the vestibule on the cleft side over the piriform rim, nasal bone, infraorbital and malar to lift the facial mask.

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

www.craniofacialinstitute.org
Minimal muscle dissection is done on the non-cleft side relieving all abnormal attachments on anterior nasal spine and columella.

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

www.craniofacialinstitute.org
Morpho-functional Cleft Lip Repair

SEPTUM IS KEY
The septum is positioned in its rightful anatomical position

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note
Morpho-functional Cleft Lip Repair

Perialveoloplasty is done to exert more medial pressure on the palatal shelves

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

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At the time of primary lip repair
(Morphofunctional Cleft Lip Repair - Perialveoplasty)


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Morpho-functional Cleft Lip Repair

Ala of nose stabilized symmetrically to match that of the normal side by taking a suture through the alar head of the nasalis muscle on the cleft side to the contralateral muscle through the septum

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

www.craniofacialinstitute.org
Morpho-functional Cleft Lip Repair

Orbicularis Oris muscle approximation and closure is done

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

www.craniofacialinstitute.org
Does this incision design protect the vascularity of the lip?
What we have identified in naso-labial vasculature in cadaver dissection

Morphological and functional variability

- **Superior Labial Artery Caliber asymmetry**
- **Superior Labial Artery Anastomosis Inconsistent**
- **Superior Labial Artery Duplications**
- **Philtral Artery Redundancy Medially**
- **Philtral Artery Asymmetry Laterally**
- **Facialis Artery Asymmetry**

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Measurements of $S_vO_2$, $rHb$, flow, ($O_2$-metab.) in 2 anatomical planes:

Tissue spectroscopy

Laser doppler flowmetry

0.4 mm $\rightarrow$ skin

4 mm $\rightarrow$ muscle

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8 surgical landmarks

22 normal
mean age 62m (SD 43)

33 unilat. Cleft preop
mean age 9m (SD 6)

29 unilat. cleft Late postop
mean age 23m (SD 48)
time postop 27.5m (SD 33.6m)
Intraoperative Vascular Anatomy, Arterial Blood Flow Velocity, and Microcirculation in Unilateral and Bilateral Cleft Lip Repair

Background: Cleft lip repair aims to normalize the distorted anatomy and function. The authors determined whether normalization of blood circulation is achieved. Methods: The authors measured the microcirculatory flow, oxygen saturation, and transcutaneous oxygen tension in the lip and nose of controls (n = 25) and in patients with unilateral and bilateral cleft lip—palate (n = 20) patients. The surgeries were performed under general anesthesia. Results: Before surgery, the arterial blood flow velocity and microcirculation were similar on either side of the nose and between groups. The microcirculatory flow was significantly higher in the probability of bilateral patients than in the control groups. The oxygen saturation in the unilateral and bilateral patients in the late postoperative period was within the range of controls and recession before surgery. Externally, the authors consistently found a prominent artery on the superficial side of the transverse muscle arches. Conclusion: These appear to be anastomotic elementary fields in unilateral and bilateral cleft lip—palate patients. The increased flow in the proboscis indicates a strong hemodynamic role in this territory, supporting the vascular system. Whether surgical preservation of the nasal cartilage supports the arches across clefts should be addressed in future studies. (Plast Reconstr Surg. 2015;136:2015. 022.) CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, V.

Vascular adaption normal microcirculation late postoperative in cleft lips.

Columella shows a flow oversupply, which is maintained late postoperative.
Comparison of Three Incisions to Repair Complete Unilateral Cleft Lip

**Afroze incision performed better**
- Cupids bow position
- Lip length
- Lip height

**Millard Incision performed better**
- Scar position

What about the nose?

**Plastic and Reconstructive Surgery, 125 (4): 1208-1216, 2010.**

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Is Primary Septoplasty necessary???

No negative sequelae can be observed after manipulation of the septum in children.  
(Smahel, Z. 1999)

Growth of the nose is favorable after primary rhinoplasty.  
(McComb, H 1996)
Complete Unilateral Cleft Lip

- Without Simonart’s band (Type I a)
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Complete Unilateral Cleft Lip

Without difference in level of alveolar ridges (Type III a)

With difference in level of alveolar ridges (Type III b)

COMMON FACTOR IN ALL UNILATERAL COMPLETE CLEFT LIPS

DEVIATED NASAL SEPTUM
Is Primary Septoplasty necessary???

A fifteen year old patient with no primary septoplasty

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SEPTOCHEILOPLASTY: Unilateral Cleft Lip

- Perichondrium is reflected on both sides of the septum
- The septum is lifted off the nasal spine
- The septum is positioned in its anatomical center
- Perichondrium is closed
- Nasalis muscle from both sides are approximated to form a sling with the septum in the new central position

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

www.craniofacialinstitute.org
Septocheiloplasty: 1 year post operatively
Septocheiloplasty: 3 years post operatively

www.craniofacialinstitute.org
Septocheiloplasty: 8 years post operatively

[Image of a child's face with a cleft lip and palate before and after surgery]

[Website link: www.craniofacialinstitute.org]
Septocheiloplasty: 15 years post operatively
2 Dimensional Photographic Analysis
Septocheiloplasty: Measuring Outcomes
2 Dimensional Photographic Analysis

Note the septal deviation and alar droop

Source:

www.craniofacialinstitute.org
Septocheiloplasty: Measuring Outcomes
2 Dimensional Photographic Analysis

Primary Cheiloplasty with Septoplasty

Note the absence of septal deviation and reduced alar droop

Source:

www.craniofacialinstitute.org
Primary septoplasty showed better results in terms of nasal symmetry when analyzed using two-dimensional photographic analyses.
3 Dimensional Photographic Analysis
Measurement: Right Nostril (Transversal)

Right Nostril Transversal: 12.1 mm

Right Nostril Transversal: 12.9 mm

3D Stereophotogrammetric analysis supported by Radboud University, Nijmegen (Prof. Stefaan Berge) and University Medical Center, Basel (Prof. Hans Florian Zeilhofer)
Landmarks & Measurements
3 D Photographs and LASER Images

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Results
3 Dimensional Nasal Analysis of Patients with Complete Unilateral Cleft Lip corrected with Septocheiloplasty

Volumetric analysis of the nose

Source:
Gosla Reddy et.al. 3D Stereo photogrammetric analysis of lip and nasal symmetry after primary cheiloseptoplasty in primary cleft lip repair.
Rhinology, 49: 546-553, 2011

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Results

3 Dimensional Nasal Analysis of Patients with Complete Unilateral Cleft Lip corrected with Septocheiloplasty

Transverse/Horizontal Nostril Length

Mean Symmetry ratio of 1.25

Vertical Nostril Length

Mean Symmetry ratio of 0.97

Source:
3 Dimensional Analysis of Patients with Complete Unilateral Cleft Lip corrected with Septocheiloplasty.
Gosla Reddy S, Mommaerts MY, Reddy R, Chaitidis D, Mueller A, Schwenzer K, Berge S: Ongoing Study, Radboud University, Netherlands and University of Basel, Switzerland

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Results

3 Dimensional Nasal Analysis of Patients with Complete Unilateral Cleft Lip corrected with Septocheiloplasty

Volumetric analysis of the nose

Ratio Left Volume vs. Right Volume = 1.09

Source:
Gosla Reddy et.al. 3D Stereophotogrammetric analysis of lip and nasal symmetry after primary cheiloseptoplasty in primary cleft lip repair.
Rhinology, 49: 546-553, 2011
Primary septoplasty showed better results in terms of nasal symmetry when analyzed using three-dimensional photographic analyses.

3D Stereophotogrammetric analysis of lip and nasal symmetry after primary cheiloseptoplasty in primary cleft lip repair.
Rhinology, 49: 546-553, 2011
My Opinion

The cleft lip defect is a 3 dimensional problem

Only a MorphoFunctional approach that addresses all three dimensions will positively effect the repair of the Unilateral Lip.

My solution

CHEILOPLASTY, SEPTOPLASTY and PERIOPLASTY

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Bring the Smile Back

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